

## Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE001MT, R060BE579MT

**Site Name:** Silty (Si), 10–14 inches Mean Annual Precipitation (MAP)**Site Number:** R058AE001MT, R060BE579MT**Major Land Resource Areas:**  
58A – Northern Rolling High Plains, North Part  
60B – Pierre Shale Plains, North Part**Rangeland Resource Units:**  
58AE – Sedimentary Plains, East  
60BE – Pierre Shale Plains, East

**1. Physiographic features:** This ecological site occurs on nearly level to strongly sloping sedimentary plains, terraces, and fans. The slopes range from 0–15%, but are mainly less than 8%. This site occurs on all exposures. Aspect is not significant.

**Elevation (feet):** 1,900–3,000**Landform:** sedimentary plain, fan, terrace**Slope (percent):** 0–15, mainly less than 8**Depth to Water Table (inches):** greater than 40**Flooding:** mainly none**Ponding:** none**Runoff Class:** slow or medium**Aspect:** not significant

**2. Climatic Features:** MLRAs 58A and 60B are considered to have a continental climate characterized by cold winters, hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are typical. The climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains and the winds move freely across the plains and account for rapid changes in temperature. Seasonal precipitation is often limiting for plant growth. Annual fluctuations in species composition and total production are typical depending on the amount and timing of rainfall. See Climatic Data Sheet MLRA 58A, east and 60B, for more details (Section II of the NRCS Field Office Technical Guide). For local climate station information, refer to <http://www.wcc.nrcs.usda.gov>.

**Frost-free period (32° F)-days:** 105–145**Freeze-free period (28° F)-days:** 125–170**Mean annual precipitation (inches):** 10–14

**3. Influencing Water Features:** None

**4. Associated sites:** Mainly Clayey, Sandy, Silty-Steep, Shallow. Occasionally Very Shallow, Claypan, Overflow, Clayey-Steep, Shallow Clay, and Gravel.

**5. Similar sites:** Sandy, Clayey, Silty-Steep, Silty-Saline, Shallow.

The Sandy and Clayey sites occupy the same landscape positions. The primary difference is soil texture and plant community.

The Silty-Saline site will differ by having a significant component of a salt tolerant plant species, soils that are salty in the lower parts of the profile, and lower production.

The Silty-Steep differs mainly by being on slopes greater than 15% and having lower production.

The Shallow site differs by being 20 inches or less to a restrictive layer or bedrock.



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**6. Soils:** These soils are loams, silt loams, very fine sandy loams, or sandy clay loams more than 20 inches deep. They include soils that have two inches or more of one of these textures over a clayey (argillic) subsoil. There are no significant limitations to plant growth.

**Parent material (kind):** alluvium, colluvium, residuum, or eolian deposits

**Parent material (origin):** sedimentary or loess

**Surface textures:** Loam, silt loam, very fine sandy loam, sandy clay loam

**Subsurface Fragments ≤3" (% volume):** 0–10

**Subsurface Fragments >3" (% volume):** 0–5

**Depth (inches):** greater than 20

**Soil surface permeability (inches per hour):** mainly moderate (0.6–2.0)

**Available Water Holding Capacity to 40" (inches):** 5–8

**Drainage Class:** moderately well to well drained

**Surface Salinity/Electrical Conductivity (mmhos/cm):** non-saline (0–4)

**Surface Sodium Absorption Ratio (SAR):** negligible

**Surface Reaction (pH) (1:1 water):** neutral to moderately alkaline (6.6–8.4)

**6a. Representative Soils:** Listed below are soils and map units which characterize this site in various counties. (Reference MT-165, Soil Interpretive Rating Report).

COUNTIES	TYPICAL SOILS	MAP UNIT
Big Horn	Colby silt loam	Cm, Cn
Custer	Yamacall loam	79A, 79C, 79D
Fallon	Eapa loam	84A, 84C, 84D
Fallon	Yamacall loam	86A, 86C, 86D
Garfield	Yamacall loam	98B, 98C, 98D
McCone	Evanston loam	60, 61
McCone	Floweree silt loam	65, 66
McCone	Yamac loam	159, 160, 161
Musselshell	Yamacall loam	33A, 33B
Prairie	Yamac loam	131, 132
Rosebud	Yamac loam	197, 198, 199

**7. Plant Community and Species Composition:** The physical aspect of this site in Historical Climax is that of a level to undulating grassland dominated by cool and warm season grasses, with forbs and shrubs occurring in smaller percentages. Approximately 75–80% of the annual production by weight is from grasses and sedges, 5–15% is from forbs, and 1–5% is from shrubs, half-shrubs, and cacti. Canopy cover of shrubs is typically 1–5%. Trees are not significant on this site.

TABLE 7a.—Major Plant Species Composition lists plant species composition and production by dry weight for the Historic Climax (HCPC) or Potential Plant Community (PPC) for this site. The Historic Climax or Potential Plant community has been determined by the study of rangeland relict areas, exclosures, or areas protected from excessive grazing. Total annual production has been derived from several data sources, and has been adjusted to represent a typical annual moisture cycle for the site. Reference for plant species names and symbols: USDA–NRCS PLANTS Database at <http://plants.usda.gov>.



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## 7a. Major Plant Species Composition – Historic Climax/Potential Plant Community

Common Name	Plant Symbol	Plant Group	Percent Comp.	Group Max. %	Mean Annual Precipitation (MAP) (Inches)				
					10 (lbs./acre)	11 (lbs./acre)	12 (lbs./acre)	13 (lbs./acre)	14 (lbs./acre)
Grasses and Sedges 75–80%					840	960	1120	1440	1760
Green needlegrass	NAV14	2	10-20		105-210	120-240	140-280	180-360	220-440
Bluebunch wheatgrass*	PSSP6	2	10-40		105-420	120-480	140-560	180-720	220-880
Western or Thickspike wheatgrass	PASM ELLAL	14	10-20		105-210	120-240	140-280	180-360	220-440
Needleandthread	HECOC8	10	10-15		105-157	120-180	140-210	180-270	220-330
Little bluestem	ANSC10	1	5-10		53-105	60-120	70-140	90-180	110-220
Big bluestem **	ANGE	1	0-5		0-T	0-T	0-70	0-90	0-110
Sideoats grama **	BOCU	3	0-5		0-T	0-T	0-70	0-90	0-110
Plains muhly	MUCU3	3	0-5		0-53	0-60	0-70	0-90	0-110
Threadleaf sedge	CAFI	12	1-5}	10	11-105 No more than 53 for any one	12-120 No more than 60 for any one	14-140 No more than 70 for any one	18-180 No more than 90 for any one	22-220 No more than 110 for any one
Blue grama	BOGR2	15	1-5}						
Prairie junegrass	KOMA	12	1-5}						
Sandberg bluegrass	POSE	12	1-5}						
Sand dropseed	SPCR	9	0-5}						
Needleleaf sedge	CADU6	16	0-5}						
Plains reedgrass	CAMO	16	0-5}						
Buffalograss	BUDA	15	0-5}						
Bottlebrush squirreltail	ELELE	10	0-5}						
Other native grasses	2GP		0-5}						
Fendler's threeawn	ARPUF	11	0-5}	T	T	T	T	T	T
Red threeawn	ARPUL	11	0-5}						
Forbs 5–15%					158	180	210	270	330
Black samson	ECAN2	21	0-5}	15	11-158 No more than 53 for any one	12-180 No more than 60 for any one	14-210 No more than 70 for any one	18-270 No more than 90 for any one	22-330 No more than 110 for any one
Blanketflower gaillardia	GAAR	23	0-5}						
Blue flax	LIPEL	28	0-5}						
Scurfpea spp.	PSORA2	23	1-5}						
Purple prairieclover	DAPU5	21	1-5}						
White prairieclover	DACA7	21	1-5}						
Hairy goldenaster	HEVI4	23	0-5}						
Prairie thermopsis	THRH	20	0-5}						
Prairie coneflower	RACO3	23	1-5}						
Dotted gayfeather	LIPU	21	1-5}						
American vetch	VIAM	18	1-5}						
Wild onion	ALLIU	32	1-5}						
Milkvetch spp.	ASTRA	24	1-5}						
Hood's phlox	PHHO	28	1-5}						
Buckwheat spp.	ERIOG	23	0-5}						
Biscuitroot spp.	LOMAT	24	0-5}						
Missouri goldenrod	SOMI2	19	0-5}						
Western gromwell	LIRU4	24	0-5}						
Penstemon spp.	PENST	28	0-5}						
Western yarrow	ACMI2	19	1-5}						
Aster spp.	ASTER	19	1-5}						
Wild parsley	MUDI	24	1-5}						
Green sagewort	ARDR4	19	0-5}						
Scarlet globemallow	SPCO	20	0-5}						
Pussytoes spp.	ANTEN	20	0-5}						
Other native forbs	2FP		0-5}						
Twogrooved poisonvetch***	ASBI2	24	0-T	T	T	T	T	T	
White point loco***	OXSE	24	0-T		T	T	T	T	T
Larkspur spp.***	DELPH	24	0-T		T	T	T	T	T
Death camas***	ZIGAD	32	0-T		T	T	T	T	T

\* The percentage of this species tends to increase in the western part of this range resource unit.

\*\* These species typically occur at 13" MAP or greater.

\*\*\* These species are poisonous to some grazing animals during at least some portion of their life cycle.



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## 7a. Major Plant Species Composition – Historic Climax/Potential Plant Community CONTINUED

Common Name	Plant Symbol	Plant Group	Percent Comp.	Group Max. %	Mean Annual Precipitation (MAP) (Inches)				
					10	11	12	13	14
					(lbs./acre)	(lbs./acre)	(lbs./acre)	(lbs./acre)	(lbs./acre)
Shrubs and Half-Shrubs 1–5 %					53	60	70	90	110
Winterfat	KRLA2	35	0-5}	5	10-53}	12-60}	14-70}	18-90}	22-110}
Nuttall's saltbush	ATNU2	34	0-5}						
Prairie rose	ROAR3	38	0-5}						
Silver sagebrush	ARCA13	36	0-5}						
Green rabbitbrush	CHVI8	36	0-5}						
Rubber rabbitbrush	ERNAN5	36	0-5}						
Wyoming big sagebrush	ARTRW8	37	0-5}						
Snowberry spp.	SYMPH	37	0-5}						
Skunkbush sumac	RHTR	33	0-5}						
Fringed sagewort	ARFR4	38	0-5}						
Greasewood	SAVE4	37	0-5}						
Other native shrubs	2SB		0-5}						
Broom snakeweed	GUSA2	37	0-T	T	T	T	T	T	T
Plains pricklypear	OPPO	38	0-T						
Yucca	YUGL	37	0-T						
Total Annual Production: (lbs./acre)			100%		1050	1200	1400	1800	2200

**7b. Plant Group Descriptions:** Plant functional groups are based on: season of growth, growth form, stature, type of root system, and ecological response to disturbance. Refer to Field Office Technical Guide (FOTG) Section II for a complete description of plant groups.

**8. Total Annual Production:** Total annual production is a measurement of the total aboveground production (dry weight) of all major plant species that occur on the site during a single growth year, regardless of accessibility to grazing animals. This information is listed at the bottom of TABLE 7a.—Major Plant Species Composition. Average production values are listed for each incremental inch of precipitation for the site.

**9. Cover and structure:** The following table shows the approximate amounts of basal cover, canopy cover, and plant heights for this site in the Historic Climax or Potential Plant Community.

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	T – 1	0 – T	0.25
Grasses/ sedges	10 – 15	60 – 85	24
Forbs	1 – 3	1 – 5	18
Shrubs	0 – 1	T – 1	24
Litter	50 – 60		
Coarse fragments	0 – T		
Bare ground	15 – 20		

**10. Ecological Dynamics:** This site developed under Northern Great Plains climatic conditions, which included the natural influence of large herbivores and occasional fire. The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC) or Potential Plant Community. This community is described as a reference to understand the original potential of this site, and is not always considered to be the management goal for every acre of rangeland. The following descriptions should enable the landowner or manager to better understand which plant communities occupy their land, and assist with setting goals for vegetation management. It can also be useful to understand the environmental and economic values of each plant community.



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This site is considered highly resilient to disturbance as it has very few soil limitations for plant growth. Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions. Under continued adverse impacts, a moderate to extreme decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments this site can more readily return to the Historic Climax Plant Community (HCPC).

Continual adverse impacts to the site over a period of years results in a departure from the HCPC, with a decrease of the taller, more palatable species such as **green needlegrass, little bluestem, and bluebunch wheatgrass**. These plants will typically be replaced by a mixture of medium and short grasses and sedges, including **western wheatgrass, needleandthread, Sandberg bluegrass, blue grama, threadleaf sedge, several species of non-palatable forbs, and Wyoming big sagebrush**. **Greasewood** may replace Wyoming big sagebrush in MLRA 60B, Pierre Shales.

Continued deterioration to the community results in an abundance of short grasses such as **blue grama, red threeawn, annual grasses, annual forbs, broom snakeweed, and cacti**.

Plants that are not a part of the Historic Climax Plant Community that are most likely to invade are annual grasses (**cheatgrass, Japanese brome**), and **annual and biennial forbs**. **Leafy spurge and knapweeds** are potential noxious weed invaders on this site.

Long-term non-use (>3 years) combined with the absence of fire will result in excessive litter and decadent plants in the bunchgrass communities at higher precipitation zones, 12–14 inches.

**10a. Major Plant Community Types:** Following are descriptions of some of the most common plant communities that may occupy this site:

**Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs:** This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC) or Potential Plant Community (PPC) for this site. This plant community contains a high diversity of tall and medium height, cool and warm season grasses (**green needlegrass, bluebunch wheatgrass** (western portion of RRU), **western wheatgrass, needleandthread, little bluestem, sideoats grama**), and short grasses and sedges (**Sandberg bluegrass, plains muhly, prairie junegrass, threadleaf sedge and blue grama**). There are abundant forbs, shrubs, and half-shrubs which occur in small percentages, including **dotted gayfeather, black samson, purple and white prairieclover, winterfat, Nuttall's saltbush, and silver or Wyoming big sagebrush**.

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and the presence of tall, deep rooted perennial grasses allows for high drought tolerance. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable precipitation. Abundant plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. Run-off from adjacent sites and high available water capacity provides a favorable soil-water-plant relationship. This plant community provides for high soil stability and a functioning hydrologic cycle.

**Community 2a: Medium and Short Grasses/ Half-shrubs:** Where this site occurs on soils in the coarse loamy or coarse silty families, slight disturbances and degradation to the HCPC will result in a plant community dominated by medium and short grasses, such as **western wheatgrass, needleandthread, Sandberg bluegrass, prairie junegrass, blue grama, and threadleaf sedge**. The tall, more palatable grasses (green needlegrass, bluebunch wheatgrass, little bluestem) will be present in smaller percentages. **Fringed sagewort** typically increases on the site.



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This community is similar to 2b, but generally has less of a shrub component. There will be some shifting of the amount of sagebrush between Communities 2a and 2b, depending on the occurrence and frequency of fire, and which species of sagebrush is present. A lack of fire in Community 2a tends to favor Wyoming big sagebrush. The presence of fire in a big sagebrush stand will generally reduce the density of plants, making the community similar to 2a. Fire will often increase the amount of silver sagebrush, however, as it will sprout from the roots after being burned.

**Plant Community 2b: Medium and Short Grasses/ Shrubs:** Where this site occurs on soils in the fine loamy or fine silty families, slight disturbances and degradation to the HCPC will result in a plant community dominated by cool season medium and short grasses, warm season short grasses, shrubs and half-shrubs. Species that tend to dominate include **western wheatgrass, needleandthread, Sandberg bluegrass, Wyoming big or silver sagebrush, and fringed sagewort**. Silver sagebrush tends to become more prevalent on old stream terraces.

Grass biomass production and litter become reduced on communities 2a and 2b as the taller grasses become less prevalent, increasing evaporation and reducing moisture retention. Additional open space in the community can result in undesirable invader species. This plant community provides for moderate soil stability.

**Plant Community 3: Medium and Short Grasses/ Shrubs and Half-shrubs:** With continued heavy disturbance on Community 2B, the plant community tends to become dominated by medium and short grasses, such as **needleandthread, western wheatgrass, blue grama, Sandberg bluegrass, prairie junegrass and threadleaf sedge, plus Wyoming big sagebrush or silver sagebrush, and fringed sagewort**. The taller grasses will occur only occasionally. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species. **Greasewood** may take the place of sagebrush in MLRA 60B. There is also often an increase in the amount of **plains pricklypear**.

The amount of Wyoming big sagebrush in Community 3 may be the result of a lack of fire in Community 4. Periodic fire tends to reduce the amount of big sagebrush that is present. Silver sagebrush, however, will react just the opposite, as it will tend to increase after a fire due to root sprouting.

**Plant Community 4: Short and Medium Grasses/ Half-shrubs/ Annuals:** As Community 2A deteriorates due to continued disturbance, it becomes dominated by short and medium grasses such as **blue grama, Sandberg bluegrass, prairie junegrass, and western wheatgrass. Fringed sagewort, cheatgrass, and broom snakeweed** increase on the site. This community will often occur due to fire on Community 2A, which causes it to lose the brush component. Annual grasses will be present for a period of time after fire. **Green needlegrass** will often respond if it was present under the sagebrush canopy prior to the fire.

Plant Communities 3 and 4 are much less productive than Plant Communities 1, 2a, or 2b, and have lost many of the attributes of a healthy rangeland. The loss of deep perennial root systems reduces total available moisture for plant growth. Reduction of plant litter will result in higher surface soil temperatures and increased evaporation losses. Annual species are often aggressive and competitive with seedlings of perennial plants. This community can respond positively to improved grazing management but it will take additional inputs to move it towards a community similar in production and composition to that of Plant Community 1 or 2.

**Plant Community 5: Short Grasses/ Shrubs & Half-shrubs/ Annuals/ Cacti:** Further disturbance and deterioration of Community 3 or 4 leads to a plant community dominated by short grasses such as **blue grama, threadleaf sedge, and red threeawn**. Shrubs, half-shrubs, and cacti may become prevalent, including **fringed sagewort, Wyoming big sagebrush, and plains pricklypear**. Invader species become significant components, including **broom snakeweed, Japanese brome, cheatgrass, six-weeks fescue, false buffalograss, tumblegrass, curlycup gumweed, and annual forbs**.



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Plant Community 5 may be associated with prairie dog towns. Prairie dog towns generally occur on this site when the soils are slightly heavier textures, particularly those having an argillic horizon. The resultant plant community is comprised mainly of **fringed sagewort, plains pricklypear, and annuals**.

This plant community is highly unproductive (< 600 lbs./acre). The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama a competitive advantage over the cool season tall and medium grasses. This community has lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow. Significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community.

**10b. Plant Communities and Transitional Pathways (State and Transition Model):** Transitions in plant community composition occur along a gradient that is not linear. Many processes are involved in the changes from one community to another. Changes in climate, elevation, soils, landform, fire patterns and frequency, and grazing all play a role in determining which of the plant communities will be expressed. The following model outlines some of the various plant communities that may occur on this site and provides a diagram of the relationship between plant community and type of use or disturbance.

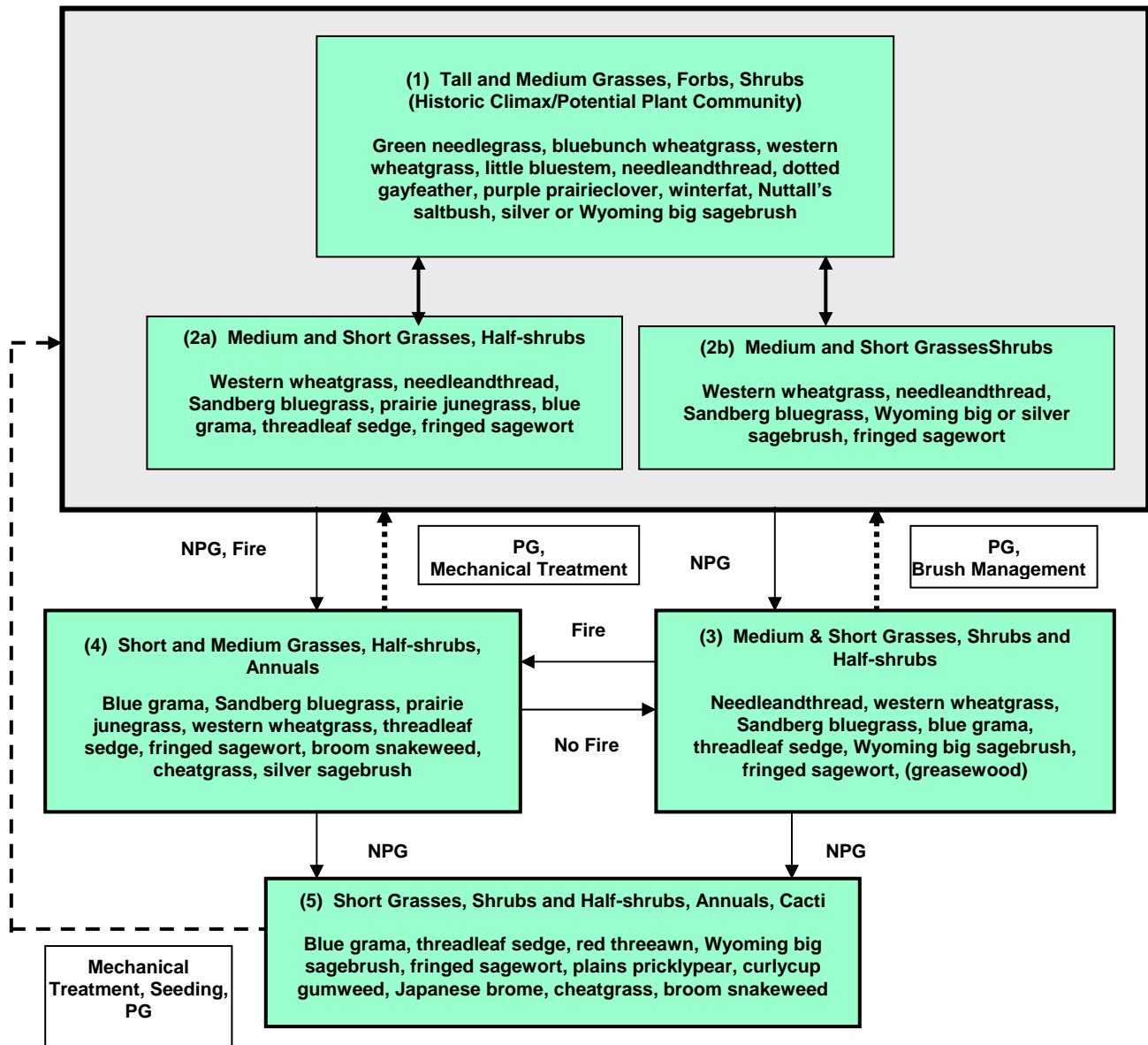


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## Plant Communities and Transitional Pathways (diagram)



Smaller boxes within a larger box indicate that these communities will normally shift among themselves with slight variations in precipitation and other disturbances. Moving outside the larger box indicates the community has crossed a threshold (heavier line) and will require intensive treatment to return to Community 1 or 2. Dotted lines indicate a reduced probability for success.

NOTE: Not all species present in the community are listed in this table. Species listed are representative of the plant functional groups that occur in the community.

PG = Prescribed Grazing: Use of a planned grazing strategy to balance animal forage demand with available forage resources. Timing, duration, and frequency of grazing are controlled and some type of grazing rotation is applied to allow for plant recovery following grazing.

NPG = Non-Prescribed Grazing: Grazing which has taken place that does not control the factors as listed above, or animal forage demand is higher than the available forage supply.

Fire: Non-prescribed wildfire.



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**11. Plant Growth Curves:** Growth of native cool-season plants begins in April and continues to the end of June. Native warm-season plants begin growth in May and continue to about the end of August. Green up of cool-season plants can occur in September through October when adequate soil moisture is present. The following tables show the approximate percentage of total growth by month that is expected to occur in various plant communities on this site for a typical moisture year.

**Growth Curve Number: MT0808**

Growth Curve Description: Includes all sedimentary plains sites with deep, loamy and clayey textured upland soils and cool season grasses.

**Totals for Each Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	30	30	5	5	5	0	0	0

**Cumulative Totals by Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	55	85	90	95	100	0	0	0

**Growth Curve Number: MT0810**

Growth Curve Description: Includes all upland sites in eastern sedimentary plains having deep soils and mainly warm season plants.

**Totals for Each Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	5	15	40	25	10	5	0	0	0

**Cumulative Totals by Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	5	20	60	85	95	100	0	0	0

**Growth Curve Number: MT0813**

Growth Curve Description: Includes all low similarity index sites in eastern sedimentary plains, dominated by short grasses.

**Totals for Each Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	25	25	10	10	5	0	0	0

**Cumulative Totals by Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	50	75	85	95	100	0	0	0

**12. Livestock Grazing Interpretations:** Managed livestock grazing is suitable on this site as it has the potential to produce a high amount of high quality forage. This is often a preferred site for grazing by livestock, and animals tend to congregate in these areas. In order to maintain the productivity of this site, stocking rates must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Silty site is not excessive. Management objectives should include maintenance or improvement of the plant community. Shorter grazing periods and adequate re-growth after grazing are recommended for plant maintenance and recovery. Heavy stocking and season-long use of this site can be detrimental and will alter the plant community composition and production over time.

Whenever Plant Communities 2a or 2b (medium and short grasses) occur, grazing management strategies need to be implemented to avoid further deterioration. These communities are still stable, productive, and healthy provided they receive proper management. These communities will respond fairly quickly to improved grazing management, including increased growing season rest of key forage plants. Grazing management alone can usually move these communities back towards the potential community.



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Plant Communities 3 and 4 have substantially reduced forage production, and a high percentage of aggressive, non-palatable species. Once these plant communities become established, it will be much more difficult to restore the site to a community that resembles the potential with grazing management alone. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site. Brush management and/or mechanical treatment are often needed to restore tall perennial grasses onto this site.

Plant Community 5 has extremely limited forage production (< 300 pounds per acre), and a high percentage of non-preferred species for cattle and sheep. Seeding may be necessary to restore desirable native perennial species.

**12a. Calculating Safe Stocking Rates:** Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains or improves rangeland health, and is consistent with management objectives. Safe stocking rates will be based on useable forage production, and should consider ecological condition and trend of the site, and past grazing use history.

Calculations used to determine a safe stocking rate are based on the amount of useable forage available, taking into account the harvest efficiency of the animal and the grazing strategy to be implemented. Average annual production must be measured or estimated to properly assess useable forage production and stocking rates.

**12b. Guide to Safe Stocking Rates:** The following charts provide a guide for determining an safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. The characteristic plant communities and production values listed may not accurately reflect the productivity of a specific piece of land. Hence, this table should not be used without on-site information collected to determine the average forage productivity of the site. Adjustments to stocking rates for each range unit must be made based on topography, slope, distance to livestock water, and other factors which effect livestock grazing behavior.



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MLRA: 58A – Sedimentary Plains, East

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R058AE001MT, R060BE579MT

### 12c. Stocking Rate Guide:

Major Plant Community Dominant Plant Species	MAP	Total Production (pounds/ac)	Cattle			Sheep		
			Forage Production	AUM/ac	Ac/AUM	Forage Production	AUM/ac	Ac/AUM
<b>1. Tall &amp; Medium Grasses, Forbs, Shrubs (HCPC/PPC)</b> <i>Green needlegrass, bluebunch wheatgrass, western wheatgrass, little bluestem, needleandthread, winterfat, Nuttall's saltbush, silver or Wyoming big sagebrush</i> <b>(S.I. &gt;75%)</b>	13-14"	1800-2200	1500-2000+	.45-.60+	1.7-2.2	1600-2100+	.50-.65+	1.5-2.0
	10-12"	1050-1400	900-1300+	.28-.40+	2.5-3.6	950-1350+	.30-.45+	2.2-3.3
<b>2a. Medium &amp; Short Grasses, Half-shrubs</b> <i>Western wheatgrass, needleandthread, Sandberg bluegrass, prairie junegrass, blue grama, fringed sagewort</i> <b>(S.I. 50-75%)</b>	13-14"	1500-1900	1100-1600	.35-.50	2.0-2.9	1200-1700	.38-.54	1.8-2.6
	10-12"	900-1200	650-1000	.20-.30	3.3-5.0	700-1100	.25-.35	2.9-4.0
<b>2b. Medium &amp; Short Grasses, Shrubs</b> <i>Western wheatgrass, needleandthread, Sandberg bluegrass, Wyoming big sagebrush, fringed sagewort</i> <b>(S.I. 50–75%)</b>	13-14"	1500-1900	1050-1500	.33-.47	2.1-3.0	1100-1600	.35-.51	2.0-2.9
	10-12"	900-1200	600-950	.19-.30	3.3-5.3	700-1000	.22-.32	3.1-4.5
<b>3. Medium &amp; Short Grasses, Shrubs &amp; Half-shrubs</b> <i>Needleandthread, western wheatgrass, Sandberg bluegrass, blue grama, threadleaf sedge, fringed sagewort, Wyoming big sagebrush, (greasewood)</i> <b>(S.I. 30–50%)</b>	10-14"	800-1650	500-1200	.15-.35	4.0-8.3	550-1300	.17-.40	2.5-5.9
<b>4. Short &amp; Medium Grasses, Half-shrubs, Annuals</b> <i>Blue grama, threadleaf sedge, western wheatgrass, fringed sagewort, broom snakeweed, , cheatgrass, silver sagebrush</i> <b>(S.I. 30–45%)</b>	10-14"	500-1100	250-600	.05-.15	6.6-20	350-700	.08-.16	6.2-12.5
<b>5. Short Grasses, Shrubs &amp; Half- shrubs, Annuals, Cacti</b> <i>Blue grama, threadleaf sedge, red threeawn, Wyoming big sagebrush, fringed sagewort, plains pricklypear, Japanese brome, cheatgrass</i> <b>(S.I. &lt; 30%)</b>	10-14"	300-600	150-300	.03-.07	14.3-33.3	200-350	.04-.08	12.5-25

Stocking rates are calculated from average forage production values using a 25% Harvest Efficiency factor for preferred and desirable plants, and 10% Harvest Efficiency for less desirable species. AUM calculations are based on 790 pounds per animal unit month (AUM) for a 1,000-pound cow with calf up to 4 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to drinking water.



# Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE001MT, R060BE579MT

## 12d. Plant Forage Preferences for Cattle and Sheep:

**Legend:** P=Preferred D=Desirable U=Undesirable E=Emergency  
N=Nonconsumed T=Toxic Blank=Unknown or no data  
Winter (W) = Jan., Feb., March; Spring (SP) = April, May, June;  
Summer (SU) = July, Aug., Sept.; Fall (F) = Oct., Nov., Dec.

PLANT NAME	Cattle				Sheep			
	W	SP	SU	F	W	SP	SU	F
Green needlegrass	P	P	P	P	P	P	P	P
Western wheatgrass	P	D	D	P	D	D	D	D
Thickspike wheatgrass	P	P	P	P	P	P	P	P
Little bluestem	P	P	P	P	U	D	D	U
Bluebunch wheatgrass	P	D	P	P	D	D	D	D
Sideoats grama	P	P	P	P	D	D	P	D
Needleandthread <sup>1/</sup>	D	D	D	D,T	D	D	D	D
Sandberg bluegrass	D	D	D	D	D	D	D	D
Threadleaf and Needleleaf sedge	D	P	P	D	D	P	D	D
Montana wheatgrass	P	P	P	P	P	P	P	P
Prairie junegrass	D	D	D	D	D	P	D	D
Plains muhly	D	D	D	D	D	D	D	D
Blue grama	D	D	D	D	D	P	P	D
Plains reedgrass	D	D	D	D	U	U	U	U
Buffalograss	D	D	D	D	D	D	D	D
Red and Fendler's threeawn	N	U	N	N	N	U	N	N
Tumblegrass	N	U	N	N	N	U	N	N
Cheatgrass <sup>2/</sup>	U	D	N	N	U	P	U	U
Black samson	N	D	D	D	D	P	P	D
Prairieclover spp.	N	D	D	D	D	D	D	D
Dotted gayfeather	N	P	P	P	D	P	D	D
Milkvetch spp. <sup>3/</sup>	N	D,T	D,T	D,T	D,T	P,T	D,T	D,T
American vetch	N	P	P	D	N	P	P	D
Prairie coneflower	N	D	D	D	D	D	D	D
Wild onion	N	P	P	N	N	P	P	N
Hood's phlox	N	N	N	N	U	U	U	U
Pussytoes spp.	N	N	N	N	U	U	U	U
Wild parsley	N	D	D	U	N	D	D	U
Green sagewort	N	N	N	N	N	N	N	N
Scarlet globemallow	N	D	D	D	N	D	D	D
Twogrooved poisonvetch	N	T	T	T	N	T	T	T
White point loco	N	T	T	T	T,N	T,N	T,N	T,N
Low larkspur	N	N,T	N,T	N	N	D,T	D,T	N
Death camas	N	T	T	N	N	T	T	N
Winterfat	P	P	P	P	P	D	D	P
Nuttall's saltbush	P	P	P	P	P	P	P	P
Prairie rose	N	N	N	N	D	D	D	D
Silver sagebrush	D	D	D	D	D	D	D	D
Green and Rubber rabbitbrush	U	U	U	U	U	U	U	U
Wyoming big sagebrush	N	N	N	N	P	D	D	P
Rocky Mountain juniper	N	N	N	N	U	N	N	N
Greasewood <sup>4/</sup>	N	N	N,E	N,E	D	U, T	U	D
Fringed sagewort	N	N	N	N	U	U	U	U
Yucca	N	N	N	N	D	D	D	D
Broom snakeweed <sup>5/</sup>	N	N	N	U	U	U	U	U
Plains pricklypear <sup>6/</sup>	N	N	N	N	U	U	U	U

<sup>1/</sup> The awns and sharp seeds of needleandthread can harm livestock when dry.

<sup>2/</sup> Not a native plant, but a common invader.

<sup>3/</sup> Some species of milkvetch are poisonous.

<sup>4/</sup> Can be toxic to sheep in spring if large quantities are ingested.

<sup>5/</sup> Broom snakeweed can be poisonous, but this is not usually a problem in Montana because plants die back in winter and do not have green leaves in early spring.

<sup>6/</sup> The spines can be injurious to livestock.



## Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE001MT, R060BE579MT

**13. Wildlife Interpretations:** The following is a description of habitat values for the different plant communities that may occupy the site:

**Plant Community 1: Tall & Medium Grasses/ Forbs/ Shrubs (HPCP or PPC):** The predominance of grasses plus a diversity of forbs, shrubs and half-shrubs in this community favors grazers and mixed feeders such as bison, pronghorn and elk. Suitable thermal and escape cover for mule deer is limited because of low shrub cover. Large animal nutrition levels are relatively high year-long because of the diversity of plant life forms and seasonality. When this plant community is adjacent to large blocks of sagebrush-grassland, it can provide quality sage grouse lek sites and brood habitat. Complex plant structural diversity and litter cover provide habitat for a wide array of small mammals (both seed-eaters, i.e., deer mice and herbivores, i.e., voles and jackrabbits) and neotropical migratory birds. Diverse prey populations are available for raptors such as golden eagle, redtail, ferruginous and Swainson's hawks. The diversity of grass stature and life forms, along with scattered shrubs and a variety of forbs, provides habitat for many bird species including the upland sandpiper, sharp-tailed grouse, loggerhead shrike, Baird's/grasshopper/savanna sparrow, chestnut-collared longspur and western meadowlark. This community is especially favorable for ground-nesting birds because of the abundant residual plant material and litter available for nesting, escape and thermal cover.

**Plant Community 2a: Medium and Short Grasses/ Half-shrubs:** The partial loss of structural diversity makes this plant community somewhat less attractive to the variety of wildlife species using the HPCP. A decrease in residual plant material and litter cover is usually associated with degradation of the HPCP, which makes this community less attractive for ground-nesting birds. Pronghorn make considerable use of this type because of forb and half-shrub availability in the generally open landscape.

**Plant Community 2b: Medium and Short Grasses/ Shrubs:** Wyoming big sagebrush, with canopy cover of 15-30 percent, and an understory of grasses and forbs, is excellent nesting, winter, brood-rearing and foraging habitat for sage grouse. Other obligate sagebrush-grassland species, notably Brewer's sparrow, also benefit from an increase in sagebrush cover. When residual grass and litter cover decrease in this community, ground nesting bird habitat values decline. This community often provides important winter range for mule deer and pronghorn. The sagebrush crowns break up hard crusted snow and provide about 15% protein and 40-60% digestibility for ungulates.

**Plant Community 3: Medium and Short Grasses/ Shrubs and Half-shrubs:** Heavy stands of big sagebrush can provide winter cover and foraging habitat for mule deer, elk, pronghorn and sage grouse. However, a decline in herbaceous cover and litter reduces overall wildlife species diversity and habitat value for ground-nesting birds. When this seral stage is dominated by forbs and fringed sagewort, it may provide lek sites for sage grouse and habitat for birds such as horned larks, McCown's longspurs, mountain plovers and long-billed curlews. Prairie dogs will have an easier time establishing and expanding towns in this community to the benefit of burrowing owls, mountain plovers and black-footed ferrets.

**Plant Community 4: Short and Medium Grasses/ Half-shrubs/ Annuals:** Sparse vegetation and greater amounts of bare ground provide suitable habitat for mountain plovers, prairie dogs, horned larks and McCown's longspurs. However, a lack of complex vegetation structure and residual cover makes this community poor habitat in general for most ground-nesting birds and relatively poor big game habitat. Pronghorn may forage in this community spring through fall.

**Plant Community 5: Short Grasses/ Shrubs & Half-shrubs/ Annuals/ Cacti:** This community has low habitat value for most wildlife species except when it occurs in prairie dog towns. It may be important in providing lek sites for sage grouse when adjacent to sagebrush stands and provides forage for pronghorn seasonally. Pronghorn forage on fringed sagewort and forbs.

Prairie dog towns are significant sources of biodiversity and provide a source of palatable, high protein forage for ungulates during part of the year. Black-footed ferrets, an endangered species, and burrowing owls are dependent on the subterranean habitat provided by prairie dog burrow systems. Mountain plovers often nest and raise broods in prairie dog towns. Golden eagles and ferruginous hawks commonly hunt in these areas. Researchers have found that bird species diversity and rodent abundance are greater on prairie dog towns than on adjacent mixed prairie.



# Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE001MT, R060BE579MT

## 13a. Plant Preferences for Antelope and Deer:

**Legend:** P=Preferred D=Desirable U=Undesirable E=Emergency  
N=Nonconsumed T=Toxic Blank=Unknown or no data

Winter (W) = Jan., Feb., March; Spring (SP) = April, May, June;  
Summer (SU) = July, Aug., Sept.; Fall (F) = Oct., Nov., Dec.

PLANT NAME	Antelope				Deer			
	W	SP	SU	F	W	SP	SU	F
Perennial grasses	P	P	P	P	D	P,D	D	D
Red threeawn	N	N	N	N	N	N	N	N
Annual grasses	N	P,D	N	D	N	P,D	N	D
Sedges	D	P	P	P	D	P	P	P
Black samson	P	P	P	P	D	D	D	D
Prairieclover spp.	P	P	P	P	P	P	P	P
Dotted gayfeather	D	P	D	D	D	P	P	P
Milkvetch spp.	D	P	P	D	D	D	D	D
Scurfpea spp.	N	D	D	D	D	D	D	D
Hairy goldenaster	E	E	E	E	E	E	E	E
Goldenrod spp.	D	P	P	P	D	D	D	D
American licorice	P	P	D	D	D	P	D	D
Prairie coneflower	D	P	P	D	D	P	D	D
American vetch	P	P	P	P	D	P	P	P
Hood's phlox	U	U	U	U	U	U	U	U
Wild parsley	U	D	U	U	U	D	U	U
Green sagewort	N	N	N	N	N	N	N	N
Scarlet globemallow	D	D	D	D	D	D	D	D
Twogrooved poisonvetch	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
White point loco	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Death camas	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Larkspur spp.	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Winterfat	P	P	P	P	P	P	P	P
Nuttall's saltbush	P	P	P	P	D	P	P	D
Prairie rose	U	U	U	U	E	D	E	E
Silver sagebrush	D	D	P	D	P	P	D	P
Wyoming big sagebrush	P	P	P	P	P	P	D	D
Rabbitbrush spp.	D	D	D	D	D	D	D	D
Rocky Mtn. juniper	N	N	N	N	D	D	D	D
Greasewood	P	P	D	D	P	P	D	D
Fringed sagewort	D	U	U	D	D	U	U	D
Green sagewort	N	N	N	N	N	N	N	N
Plains pricklypear	N	N	N	N	N	N	N	N
Broom snakeweed	N	N	D	N	D	D	P	P

**14. Hydrology Data:** The soils associated with this ecological site are generally in Hydrologic Soil Group B. The infiltration rates for these soils will normally be moderate. The runoff potential for this site is moderate, depending on slope and ground cover/health. Runoff curve numbers generally range from 64 to 82.

Good hydrologic conditions exist on rangelands if plant cover (grass, litter, and brush canopy) is greater than 70%. Fair conditions exist when cover is between 30% and 70%, and poor conditions exist when cover is less than 30%. Sites in high similarity to HCPC (Plant Communities 1 and 2) generally have enough plant cover and litter to optimize infiltration, minimize runoff and erosion, and have a good hydrologic condition. The deep root systems of the potential vegetation help maintain or increase infiltration rates and reduce runoff.



## Ecological Site Description—Rangeland

Silty, 10–14" MAP

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Sites in low similarity (Plant Communities 3, 4 and 5) are generally considered to be in poor hydrologic condition as a majority of the plant cover is from shallow-rooted species such as blue grama and annual grasses.

Erosion is minor for sites in high similarity. Rills and gullies should not be present. Water flow patterns, if present, will be barely observable. Plant pedestals are essentially non-existent. Plant litter remains in place and is not moved by erosion. Soil surfaces should not be compacted or crusted. Plant cover and litter helps retain soil moisture for use by the plants. Maintaining a healthy stand of perennial vegetation will optimize the amount of precipitation that is received. (Reference: Engineering Field Manual, Chapter 2 and Montana Supplement 4).

**15. Recreation and Natural Beauty:** This site provides recreational opportunities for big game and upland bird hunting, and hiking. The forbs have flowers that appeal to photographers. This site provides valuable open space and visual aesthetics.

**16. Wood Products:** None

**17. Site Documentation:**

**Authors:** Original: REL, AJN, 1983      Revised: JVF, REL, RSN, MJR, SKW, SVF, POH, 2003

### Supporting Data for Site Development:

NRCS–Production & Composition Record for Native Grazing Lands (Range-417): 42  
BLM–Soil & Vegetation Inventory Method (SVIM) Data: 25  
NRCS–Range Condition Record (ECS-2): 55  
NRCS–Range/Soil Correlation Observations & Soil 232 notes: 180

### Field Offices where this site occurs within the state:

Baker	Ekalaka	Hysham	Sidney
Billings	Forsyth	Jordan	Terry
Broadus	Glendive	Miles City	Wibaux
Circle	Hardin	Roundup	

**Site Approval:** This site has been reviewed and approved for use:

Rhonda Sue Noggles  
State Rangeland Management Specialist

06/30/03  
Date



## Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE001MT, R060BE579MT



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**Custer County**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**Custer County**



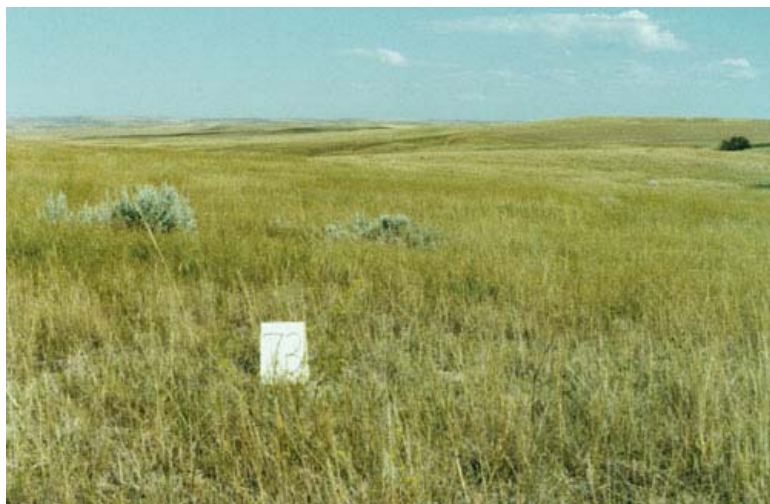
**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**McCone County**



## Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE001MT, R060BE579MT



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 2A**  
**Western wheatgrass,**  
**needleandthread**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 2B**  
**Western wheatgrass,**  
**Wyoming big sagebrush**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Needleandthread, blue grama,**  
**silver sagebrush**



## Ecological Site Description—Rangeland

Silty, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
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**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 3 – MLRA 60B**  
**Needleandthread, greasewood**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 4**  
**Blue grama, prairie junegrass**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 4**  
**Blue grama, prairie junegrass**



## Ecological Site Description—Rangeland

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**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 5**  
**Excessive Bare Ground**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 5**  
**Prairie Dog Town**  
**Plains pricklypear, blue grama**



**Silty 10-14"**  
**Sedimentary Plains, east**  
**Plant Community 5**  
**Blue grama, plains pricklypear**